

ON THE DIURNAL LEPIDOPTERA OF THE ATHABASKA AND MACKENZIE REGION, BRITISH AMERICA.

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INTRODUCTION.

During the summer of 1903 I was engaged in making a biological exploration in portions of the Athabaska and Mackenzie valleys for the United States Department of Agriculture. My time was chiefly occupied with the larger forms of life, but a good opportunity was afforded for making observations upon, and collecting a representative series of, northern butterflies. Nearly 150 specimens were taken, representing 45 species and subspecies. Two butterflies in this collection proved new to science. Dr. Harrison G. Dyar has recently described them as *Encis caryi* and *Encis nahanni*.^a

The region traversed lies between the fifty-fifth and sixty-third parallels of latitude, and includes portions of the valleys of the Athabaska, Slave, and Mackenzie rivers, and of their lake basins, Athabaska and Great Slave lakes.

Edward A. Preble, also of the Department of Agriculture, whom I accompanied in 1903, made a small collection in August of that year at Fort Rae, Great Slave Lake, and on the traverse between that post and Great Bear Lake. Wintering at Fort Simpson, Mr. Preble spent the following summer in the lower Mackenzie Basin, and secured a representative collection of butterflies as far north as Fort McPherson (latitude 67° 20'). A new form of *Thanaos propertius*, from the mouth of Nahanni River, is described for the first time in the present paper.

These two collections, representing 53 species and varieties, form a very good basis for a preliminary report on the butterflies of this little-known region. I presented to the United States National Museum that portion of the material which was desired for the national collections.

^aProc. Ent. Soc. Wash., VI, 1904, p. 142.

Most of the localities at which collections were made are somewhat obscure, and not all are indicated upon modern maps. With one exception they are trading posts of the Hudson's Bay Company. It may be well to mention the more important localities, with latitude and other data, in the following introductory list:

Fort McMurray, Athabaska.—At the confluence of the Clearwater and Athabaska rivers. Collections were made along the Athabaska River, near this post, early in August, 1903.

Fort Chipewyan, Athabaska.—On the north shore of Athabaska Lake near its outlet. The eastern portion of the lake was still ice-bound when I reached Chipewyan on June 1, 1903, but the western part had been navigable for some days. Vegetation was not far advanced at that time, but several balmy days in succession brought out many butterflies, and a number of species were collected. Fort Chipewyan is a good spot for collecting, there being many open, mossy slopes with a southern exposure on the Archaean hills about the post.

Smith Portage, Athabaska (latitude 60°).—A 16-mile portage around the Smith Rapids, connecting Smith Landing, Athabaska, and Fort Smith, Mackenzie. Butterflies were numerous in the muskegs^a and about the water holes along the portage trail, June 11 to 13, 1903.

Fort Resolution, Mackenzie.—On the south shore of Great Slave Lake near the delta of Slave River. Fair collecting was obtained on the open ground between the post and the lake shore late in June.

Hay River, Mackenzie.—At the debouchure of Hay River on the southwest shore of Great Slave Lake. The last three days of June were spent here, but owing to the inclemency of the weather very little collecting was done. A few species were taken in a swampy tract adjoining the lake.

Fort Rae, Mackenzie.—On the northern arm of Great Slave Lake. A few species were collected by Mr. Preble in August, 1903. Hudsonian faunal conditions.

Fort Providence, Mackenzie.—On the north bank of the Mackenzie River, a short distance west of Great Slave Lake. Butterflies were numerous early in July. Many species were taken in the open pasture back of the post, chiefly at the flowers of the silverberry (*Elaeagnus argentea*), and a species of gooseberry (*Ribes oxycanthoides*).

Fort Simpson, Mackenzie (latitude 61° 52').—At the confluence of the Liard and Mackenzie rivers. Mr. Preble collected here in May, 1904, and several collections have been made in the past. One of the best localities in the North for the lepidopterist.

Mouth North Nahanni River, Mackenzie.—West bank of Mackenzie River, 75 miles below Fort Simpson. The Mackenzie is here sharply

^aThroughout British America the term "muskeg" is applied to a peculiar type of swamp or bog in which moss has accumulated to a considerable depth. It usually supports a scanty growth of tamarack or spruce.

deflected to the northward by the Nahanni Mountains, an eastern spur of the Rockies, and a range of some 3,000 feet altitude closely parallels the river on the west. Several mountain forms of butterflies were taken in this vicinity, while on the plain between the river and mountains, where the typical northern spruce forest and muskeg conditions obtain, species of more general distribution were secured.

Fort Norman, Mackenzie.—On the Mackenzie River, near the mouth of Bear River. Mr. Preble collected a few species here in June, 1904.

Fort Good Hope, Mackenzie (latitude 66° 15').—On Mackenzie River. Some very interesting species were obtained by Mr. Preble late in June, 1904. A good locality for semi-Arctic forms. Hudsonian zone conditions predominate.

Fort McPherson, Mackenzie (latitude 67° 20').—On Peel River, 30 miles above its confluence with the Mackenzie. In this region the forest trees are very much dwarfed, and in places an approach to Barren Ground conditions is found. The butterflies which Mr. Preble obtained here early in July, 1904, were chiefly Arctic species and highly interesting from a geographic point of view, since they serve to fill in the gap between the Alaskan fauna and that of eastern Arctic America.

PREVIOUS WORK.

Although a few butterflies had been brought back to England from Boothia Felix by Sir John Ross, one of the earlier Arctic explorers, the vast region of tundra and forest on the mainland to the west and southwest, now known as Mackenzie and Athabaska districts, remained practically unexplored entomologically until 1825–26, when Franklin made his second journey to the Arctic regions. On this expedition, as on his first Arctic journey, 1819–1822, Franklin was accompanied by that most indefatigable naturalist, Dr. John Richardson, and valuable collections in various departments of natural history were secured. These collections were elaborated in the several volumes of *Fauna Boreali-Americana*, the insects being treated by Rev. William Kirby in the fourth volume, which appeared in 1837.^a

Very nearly a quarter of a century then elapsed before any more entomological collecting was done in the Athabaska and Mackenzie regions. In 1848–49 Sir John Richardson made his third journey to the Arctic, this time accompanied by John Rae, and in search of his former companion, Franklin. The route followed from Lake Winnipeg was by way of the Saskatchewan River and Methye Portage to the Athabaska River, thence down the Athabaska, Slave, and Mackenzie rivers to the Arctic coast. The winter was spent at Fort Confidence, on Great Bear Lake, and the return journey in 1849 made over much the same route. A list of the entomological collections secured by Richard-

^a For full reference to publications see Bibliography, p. 456.

son and Rae, with a very few annotations, was prepared by Adam White, and is to be found in the second volume of Richardson's narrative of the journey.^a Sixteen species of butterflies, taken chiefly along the Mackenzie River, and on the Arctic coast^b near its delta, are mentioned.

In the summer of 1862 Mrs. Christina Ross, wife of Bernard R. Ross, who was then in charge of Mackenzie district for the Hudson's Bay Company, collected a large number of butterflies at Fort Simpson, as well as at other points on the Mackenzie River and in the Great Slave Lake region. A considerable portion of Mrs. Ross' collection found its way into the hands of William H. Edwards, of Coalburg, West Virginia. In the three volumes of his great work on North American butterflies Edwards frequently refers to species obtained from Mrs. Ross.

At about the same period Woldemar Geffcken, of Stuttgart, Germany, received several large consignments of lepidoptera from officials of the Hudson's Bay Company. These were said to have been collected by Indian boys and girls in the region between Hudson Bay and Lake Athabaska. The late Dr. Herman Strecker, of Reading, Pennsylvania, afterwards came into possession of this material, and published an annotated list of thirteen species in his *Lepidoptera, Rhopaloceres and Heteroceres*. With the exception of Lake Athabaska, which is mentioned in connection with but two or three species, no definite localities are given—merely a vague reference to the general region between Hudson Bay and Lake Athabaska.

Small collections of butterflies have been made from time to time in various portions of the north by exploring parties sent out by the Canadian Geological Survey, and are now in the Government collections at Ottawa. In the early summer of 1888 R. G. McConnell journeyed down the Liard River to Fort Simpson, having crossed the Rockies from the Pacific. He collected four species of butterflies at the Devil's Portage, on the Liard (longitude $126^{\circ} 10'$). In June and July of the same year Frederick Bell, an official of the Hudson's Bay Company, made a small collection at Fort Simpson at the instance of Mr. McConnell, securing ten species. During the same season William Ogilvie, while making an exploration of the lower Mackenzie Basin, took five species of butterflies, which were listed, together with the two collections mentioned above, in the Annual Report of the Canadian Geological Survey for 1887-88.

During the summer of 1892, Miss Elizabeth Taylor, daughter of

^a Arctic Searching Expedition, II, 1851.

^b Richardson's locality, "Arctic coast, between $67\frac{1}{2}^{\circ}$ and 68° ," is commonly supposed to have been somewhere in the delta region of the Mackenzie River. His "Arctic coast" specimens, however, probably were collected east of the mouth of the Mackenzie, as butterflies were taken by the party as far east as Cape Krusenstern.

James W. Taylor, for some years United States consul at Winnipeg, traveled down the Athabaska, Slave, and Mackenzie rivers, going as far north as Fort McPherson. A collection of eighteen species of butterflies secured by Miss Taylor at various points along the route was deposited in the British Museum, and has been reviewed by A. G. Butler.^a

Frank Russell, of the University of Iowa, made a zoological exploration in portions of the far north in 1893-94. Appended to his report^b is a list of the insects collected, furnished by H. F. Wickham. Two species of diurnals were taken by Mr. Russell at Fort Rae.

I am informed by Francis A. Heron that the British Museum contains several species collected in the Great Slave Lake region in 1894 by W. G. Cumming, an English traveler.

In 1902, David T. Hanbury, the well-known English explorer, crossed the Barren Grounds from Chesterfield Inlet to Great Bear Lake. Assisted by his companion, Hubert Darrell, a small but highly interesting collection of Arctic butterflies was obtained at various points along the Arctic coast between Chapman Island and the mouth of the Coppermine River during June and the early part of July. Several species were also secured by Mr. Hanbury later in July on the traverse between Coppermine River and Great Bear Lake. H. J. Elwes has reviewed this collection in the Transactions of the Entomological Society of London for 1903.

The Government collections in Ottawa contain seven species of butterflies collected by James M. Macoun, of the Canadian Geological Survey, in the vicinity of Dunvegan, on the upper Peace River, Athabaska, during the summer of 1903. Mr. Macoun writes me that his collecting was done on the bench back from Peace River, at an altitude of about 2,500 feet. Dr. James Fletcher has kindly furnished me with determinations of this collection.

GENERAL ACCOUNT OF THE REGION.

The scope of country treated in the present paper is that part of northwestern British America known as the districts of Athabaska and Mackenzie. This territory lies between Keewatin on the east and the main range of the Rocky Mountains. The fifty-fifth parallel is the southern boundary, and it extends northward to the Arctic Ocean. The southern portion of the region is but slightly diversified. The monotony of seemingly endless spruce forest is relieved only by the numerous streams and chains of lakes. Muskegs and swales abound. Similar conditions obtain in the Mackenzie Basin almost to the delta, but the forest of spruce and poplar is less luxuriant north of latitude

^a Annals Nat. Hist. (6), XII, 1893, pp. 12-14.

^b Explorations in the Far North, 1898.

63°, and much dwarfed north of the Arctic Circle. Considerable open country is found on the upper Peace River, in western Athabaska, especially in the region known as the Grand Prairie.

In eastern and northern Mackenzie is found that vast area of open tundra commonly known as the "Barren Lands" or "Barren Grounds." This tundra region, while it does not lie entirely north of the Arctic Circle, is essentially Arctic in a zoögeographic sense. During the short summer season, extending from June to August, the Barren Grounds are covered with a profusion of wild flowers, and a number of species of Arctic butterflies lend their beauty to a landscape which for eight or nine months of the year is a frozen waste.

While traveling along the Arctic coast west of Bathurst Inlet in 1902, Mr. Hanbury first met with butterflies near Lewes Island on June 26, and remarks that numbers were to be seen June 27 on the southwest point of Chapman Island.^a Some idea may be gained of the rapid progress and shortness of the summer season in this latitude (67° N.) from Mr. Hanbury's observations. Regarding the conditions of vegetation on July 12, near Point Epworth, we have the following: "Vegetation was very luxuriant, and the ground showed a profusion of blossom. The miniature rhododendron, with its mass of red blossom, the white blossom of our friend the *i-klu-ti*, the heather * * * and a white anemone were the most conspicuous."^b

Writing in his journal July 15, when encamped a short distance west of Point Epworth (114° W., 67° 40' N.), Mr. Hanbury says: "Darrell collected butterflies for me. It did not appear as if I should be able to add largely to either collection [plants and insects], for both butterflies and flowers seemed to be nearly over. A blue lupin (*Lupinus nootkatensis*), which is very common in the Northland, was still in flower."^c

The summer was rapidly drawing to a close when Hanbury reached the mouth of Dismal Creek, or Kendall River, at its junction with the Coppermine. He says: "Land on either side of the river was low, and supported a stunted growth of spruce trees. * * * I collected a few butterflies, but they were now hardly worth taking. They had been much knocked about by wind and weather, and a large number of them could scarcely fly at all."^d

The Athabaska-Mackenzie region is in most portions still a virgin wilderness, and the extreme difficulty of travel will for many years prevent a thorough exploration. Future work in the mountainous region west of the Mackenzie River will unquestionably add a number of mountain species of butterflies; while additional species may be

^aSport and Travel in the Northland of Canada, 1904, pp. 172-173.

^bIdem, p. 190. ^cIdem, p. 192. ^dIdem, p. 209.

looked for from the Barren Grounds of eastern Mackenzie. The Grand Prairie region, and other open country on the upper Peace River, should also yield interesting species, several plains butterflies doubtless having their northern limits of range in this section.

A most important addition to our knowledge of northern butterflies will be in regard to their life histories. In the case of the majority of Arctic species these are yet to be worked out.

In the present list, which should be considered preliminary, I have attempted to collect and verify, so far as possible, the scattered records of the past, and thus bring under one heading our present knowledge of the distribution of butterflies in the region treated. I have included records from outside of Mackenzie and Athabaska wherever it has seemed advisable, and where such a record has an important bearing upon the distribution of a species in the north. Eighty-five species and subspecies of butterflies are now known to inhabit Mackenzie and Athabaska. Of this number 21 were collected in the region for the first time in 1903-4 by Mr. Preble and the writer.

The nomenclature and sequence followed in the annotated list of species is that of Dr. Harrison G. Dyar's List of North American Lepidoptera [= Bulletin No. 52, U. S. National Museum, 1902].

ACKNOWLEDGMENTS.

During the preparation of this paper the writer has been placed under obligations to Dr. Harrison G. Dyar, custodian of lepidoptera, U. S. National Museum, for the determination of some of the more obscure forms, as well as for access to the collections under his charge. My thanks are also cordially extended to Sir George F. Hampson and Francis A. Heron of the British Museum, who have kindly furnished me with data regarding specimens in the collections under their charge; likewise to William Beutenmüller of the American Museum of Natural History, New York. To Dr. James Fletcher and J. A. Guignard, entomologist and assistant entomologist, respectively, of the Canadian Department of Agriculture, I am also indebted—to the former for valuable information, and to the latter for access to the government insect collections at Ottawa.

LIST OF DIURNAL LEPIDOPTERA.

PAPILIO TURNUS Linnæus.

No specimens were taken by Mr. Preble and the writer, but nearly all of the earlier collections made in the region contained Papilios which have been referred to *turnus* by various writers. I have been unable to verify the earlier records of *P. turnus*, and it is possible some of them may have been based upon specimens of *P. rutulus*, the species which we secured in 1903-4.

White records specimens taken at Fort Simpson by Richardson in 1848.^a Edwards formerly received several examples from Mrs. Ross, taken at Fort Simpson, and remarks upon their small size, as compared with United States specimens.^b *P. turnus* is mentioned by Strecker among species collected in the Athabaska region, between Lake Athabaska and Hudson Bay, which he received from Geffcken. He also refers to the unusually small size and dark markings of northern specimens.^c Five examples which Frederick Bell collected at Fort Simpson, June 24 to July 8, 1888, and others collected by R. G. McConnell at the Devil's Portage, Liard River (longitude 126° 10'), July 15, 1887, have been recorded by Doctor Fletcher.^d A. G. Butler records two specimens of the small Arctic form of *P. turnus* in the British Museum which Miss Elizabeth Taylor collected in 1892.^e One was taken June 3 on the "banks of the Athabaska River;" the other June 29, at the Rapids of the Drowned, Slave River.

PAPILIO RUTULUS (Boisduval).

This species was first met with on the Slave River, June 9, 1903, when one was seen flying across the stream at a point some 50 miles north of Fort Chipewyan. Several were also noted along the Smith Portage, June 12. They were common on the Slave River, near the Grand Détour,^f June 16, and also at Fort Resolution, June 23 to 27. At Fort Providence numbers of these butterflies were seen on the blossoms of the silverberry (*Elwagnus argentea*), and two were secured July 8. Two were observed at Fort Simpson, July 10.

My two specimens from Fort Providence, and also a female taken by Mr. Preble at Fort Good Hope, June 25, 1904, are much smaller than more southern examples, with the black markings heavier. Mr. Preble saw the first Papilios flying near Fort Simpson, June 2, the earliest date for that latitude of which I have a record.

PAPILIO MACHAON var. ALIASKA Scudder.

During the middle of July, 1903, a few individuals of this fine species were observed on the Nahanni Mountains. I captured a single fresh example, July 16, on the summit of an isolated peak^g not more than 5 miles from the confluence of the North Nahanni and Mackenzie rivers. The altitude of this mountain is about 2,500 feet. Mr.

^a Arctic Searching Expedition, II, 1851, p. 362.

^b Butterflies of North America, II, 1884.

^c Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 132.

^d Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), pp. 229, 231 B.

^e Annals Nat. Hist. (6), XII, 1893, p. 14.

^f Fifty miles below Fort Smith, Mackenzie.

^g Among the Slavé Indians this mountain is known as *Tha-ou-tha* (lit. *by itself*), and for the sake of convenience I shall apply this name to it in the present article.

Preble took another specimen of *aliaska* on the north bank of the Mackenzie River, opposite the mouth of the North Nahanni River, July 25, 1904.

There appear to be but two previous records for this region. Edwards mentions the occurrence of *aliaska* as far east as Rupert's House, on the eastern shore of James Bay;^a while Doctor Fletcher records a specimen taken at Fort McPherson, June 21, 1888, by William Ogilvie of the Canadian Geological Survey.^b

This butterfly is chiefly a mountain form. It is common in Alaska, and probably also occurs in fair numbers throughout the mountain ranges west of the Mackenzie River. The Rupert's House specimen recorded by Edwards points at least to the probable occurrence of *aliaska* in the region between Hudson Bay and the Rocky Mountains.

PONTIA SISYMBRII (Boisduval).

A single specimen in beautiful condition was secured at Fort Chipewyan, June 4, 1903. A number of others were flying about the mossy Archaean rocks near the lake shore. It was a balmy spring day, and insect life was beginning to be astir in that northern latitude. Bees of the genus *Osmia* were common at the flowers of the bearberry (*Arctostaphylos uva-ursi*), and two or three species of *Bombus* were darting about the rocks.

Several butterflies of the genus *Pontia* which were seen flying across the Athabaska River 40 miles below Fort McMurray, May 29, may have been *sisymbrii*. Others noted on the Slave River, near Smith Landing, June 9, probably belonged to this species.

The Fort Chipewyan specimen extends the known range of *P. sisymbrii* far to the northward.

PONTIA NAPI var. OLERACEA (Harris).

Occurs abundantly throughout the region. This form was first noted on the Smith Portage, June 12, 1903, but had apparently been flying for some days. It was very numerous in open, grassy situations at Fort Resolution a week later. Numbers of these butterflies were collected.

White records a species of *Pontia* which Richardson collected at Fort Simpson.^c This reference may have been either to a specimen of *P. oleracea* or *P. occidentalis*. Unfortunately the specimen cannot now be traced, and in all probability has been lost. Scudder, in his work on the Butterflies of New England, gives the following northern

^aRept. Nat. Hist. Collections in Alaska, Pt. 4, 1887, p. 327.

^bAnn. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 230 B.

^cArctic Searching Expedition, II, 1851, p. 362.

records for *oleracea*: "Mackenzie river, at lat. 65° (Kirby);^a Great Slave Lake (Brit. Mus.); Athabasca region (Geffcken)."^b Doctor Fletcher records 13 specimens which Frederick Bell collected at Fort Simpson in June, 1888.^c

P. oleracea is the common form in Athabaska and the southern portions of Mackenzie,^d being replaced farther north by the form *hulda* Edwards.

PONTIA NAPI var. HULDA (Edwards).

This is apparently the prevailing form in the region between the sixty-fourth parallel and the Arctic coast. Mr. Preble secured a goodly series in the summer of 1904 at the following localities in the lower Mackenzie Basin: Fort Norman, June 13; Fort Good Hope, June 21 to 23; Fort McPherson, July 6 to 8.

Kirby described *Pontia casta* from "three specimens taken in lat. 65°" (probably on the Mackenzie River).^e The name of the collector is not given, but the specimens were very probably collected by Doctor Richardson, on Franklin's second expedition, in 1825-26. White, in Richardson's narrative,^f records *Pontia casta* Kirby from the "Arctic Coast between 67½° and 68°."^g The latter record is of specimens taken on Richardson's third journey, in 1848-49.

This butterfly has been recorded from Fort McPherson by Doctor Fletcher,^h specimens having been taken at that post by William Ogilvie, June 21, 1888. A. G. Butler records specimens collected by Miss Elizabeth Taylor at Fort McPherson, July 15, 1892, and also at the Rapids of the Drowned, Slave River, June 29 and 30, 1892.ⁱ

PONTIA OCCIDENTALIS (Reakirt).

This species appears to be uncommon, and occurs only in the mountainous portions of Mackenzie. I captured a single example on the Nahanni Mountains, July 16, 1903, at an altitude of 2,000 feet. In 1904, Mr. Preble took two specimens at Fort Good Hope, June 21 to 23.

P. occidentalis has not been previously recorded from the region.

^a Probably the type of "*Pontia casta*" Kirby. This specimen, which was formerly in the British Museum, has been lost. A. G. Butler treated the name *casta* as a synonym of *hulda* Edwards, and it seems best to thus consider it, as *hulda* is the common form at that latitude.

^b Butterflies of Eastern United States and Canada, II, 1889, p. 1197.

^c Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, 1889, p. 231 B.

^d Strecker (Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 132), mentions several examples of *P. napi* var. *frigida*, which he received from Geffcken. No definite locality is given, merely "between Hudson's Bay and Lake Athabasca."

^e Fauna Boreali-Americana, IV, 1837, p. 288, fig. 3.

^f Arctic Searching Expedition, II, 1851, p. 362.

^g See Introduction, p. 428, footnote.

^h Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 230 B.

ⁱ Annals Nat. Hist., (6), XII, 1893, p. 13.

PONTIA OCCIDENTALIS CALYCE Edwards.

A specimen taken by Mr. Preble at Fort Good Hope, June 21, 1904, proves referable to the present form, and greatly extends its range northward.

SYNCHLOE AUSONIDES (Boisduval).

This beautiful species is common throughout the region. In 1903, I first observed it on the Smith Portage, June 12, and secured fresh examples at Fort Smith two days later. It was present at all localities visited that season as far north as the Nahanni Mountains, and a fine series was collected. Mr. Preble found it at Fort Good Hope, in 1904, and took two males. He observed it flying at Fort Simpson as early as May 19. *S. ausonides* is usually found in open, grassy situations; occasionally in muskegs, but more often on higher ground.

White records a *Synchlœ* which Richardson collected on the "Arctic Coast between lat. $67\frac{1}{2}^{\circ}$ and 68° ," in 1848, as "*Anthocharis* —? n. s. (near *A. simplonia*)."^a Richardson's specimens were doubtless *ausonides*, as this species is the only one known to occur in the far north. Doctor Fletcher records a specimen taken by Ogilvie on "Mackenzie River", July 8, 1888.^b Under the name *Euchloë simplonia* Butler records specimens of this species which Miss Elizabeth Taylor collected at the Rapids of the Drowned, Slave River, June 29, 1892.^c *E. simplonia* is a European species.

EURYMUS HECLA (Lefebvre).

Elwes records four males and three females which were collected by David Hanbury on the Barren Grounds of eastern Mackenzie at 114° W., $67^{\circ} 40'$ N. (Arctic coast, in the vicinity of Point Epworth), July 13 to 16, 1902.^d Mr. Preble captured a single male example at Fort Good Hope, June 20, 1904.

E. hecla is strictly an Arctic species, and could not reasonably be expected to occur in the heavy forest region of southern Mackenzie and Athabaska.

EURYMUS BOOTHII Curtis.

This variable Arctic species, described from Boothia Felix, has been taken in Mackenzie by but two explorers.

White mentions specimens of this butterfly collected by Richardson in 1848 "on the Arctic Coast, between lat. $67\frac{1}{2}^{\circ}$ and 68° ."^e In 1902

^a Arctic Searching Expedition, II, 1851, p. 362.

^b Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231 B.

^c Annals Nat. Hist. (6), XI, 1893, p. 14.

^d Trans. Ent. Soc. London, Pt. 3, 1903, p. 242.

^e Arctic Searching Expedition, II, 1851, p. 362.

Hanbury found it fairly common at Point Epworth, July 7; Gray's Bay, July 3; and on the Barren Grounds (Arctic coast, between Point Epworth and the mouth of Coppermine River), July 13 and 14; taking a number of specimens.^a

EURYMUS OCCIDENTALIS (Scudder).

Apparently an uncommon species in the north. We did not meet with it in 1903-4.

The cotype came from Fort Simpson, Mackenzie.

Edwards mentions specimens taken on Mackenzie River,^b presumably at Fort Simpson, by Mrs. Ross; while Doctor Fletcher records a specimen which Frederick Bell collected at Fort Simpson, July 17, 1888.^c

E. occidentalis has a more western range than any of the other species of *Eurymus* recorded from Mackenzie and Athabaska. Doctor Scudder based his original description of the species upon specimens from the Gulf of Georgia, British Columbia, and Fort Simpson, Mackenzie.

EURYMUS CHRISTINA (Edwards).

The type of this species came from Smith Rapids, Athabaska.

This large and extremely variable species seems to be by far the most abundant *Eurymus* in the southern portions, where it has a general distribution. I did not meet with it in 1903, but in 1904 Mr. Preble collected several at Fort Good Hope, June 21, and a series of 15 specimens near the mouth of the North Nahanni River, July 25. Mr. Preble's specimens are of both sexes, and exhibit a great amount of variation, especially in the amount of orange suffusion on the fore wings of the males. It is probable that *E. christina* does not appear until reasonably late in the summer. In 1903, I spent nearly a week during the middle of July at the mouth of the North Nahanni River, where Mr. Preble secured his fine series in 1904, but captured only *E. paluano*. Doctor Fletcher writes me that during the same season J. M. Macoun of the Canadian Geological Survey collected specimens in the vicinity of Dunvegan, Athabaska, on the upper Peace River.

Edwards named this species after Mrs. Christina Ross, who collected the type series at the "Portage of Slave River" [Smith Rapids] in 1862.^d Strecker mentions numerous examples of *christina* received by him from Herr Geffcken, which had been taken in the region to the west of Hudson Bay, many of them from near Lake Athabaska.^e Individual variation was at a maximum in Doctor Strecker's series,

^aTrans. Ent. Soc. London, Pt. 3, 1903, p. 242.

^bButterflies of North America, I, 1879 [p. 57].

^cAnn. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231 B.

^dProc. Ent. Soc. Phila., II, 1863, p. 79.

^eLepidoptera, Rhopaloceres and Heteroceres, 1872, p. 133.

and a marked geographical variation was also exhibited, males from Lake Athabaska being much more heavily suffused with orange than Hudson Bay specimens. Doctor Fletcher records two examples which Frederick Bell collected at Fort Simpson—a male, July 17, and a female, July 25, 1888; and also lists the species from Fort Good Hope, where William Ogilvie secured it August [July?] 11 of the same year.^a

E. christina has its center of abundance in the Saskatchewan region.

EURYMUS PALAENO (Linnæus).

This species occurs in small numbers from Fort Providence northward, and is usually seen in grassy muskegs. I collected six specimens in 1903, as follows: Fort Providence, July 8, four; Nahanni Mountains, July 16, two. Mr. Preble did not meet with this butterfly on the lower Mackenzie River in 1904.

White records specimens secured by Richardson at Fort Simpson in 1848.^b Edwards based his description of *Colias helena* (= *palaeno* Linnæus) upon specimens "from Mackenzie's River, taken by Mrs. Ross."^c Doctor Strecker mentions 25 specimens of *E. palaeno* in the collection he received from Geffcken.^d It is probable that some of the latter were taken within Athabaska district.

EURYMUS ALEXANDRA var. EMILIA (Edwards).

I found this large, handsome *Eurymus* in small numbers at Fort Providence early in July, 1903, and also saw one or two near the mouth of the North Nahanni River a week or so later. Two males taken at Fort Providence, July 8, were in excellent condition. This butterfly was observed only in grassy muskegs.

E. emilia is a western form, and has not been previously recorded from the north.

EURYMUS NASTES (Boisduval).

Elwes records four males and two females from the Barren Grounds, 140° W., 67° 40' N.^e These specimens were taken by the Hanbury expedition in 1902. Francis A. Heron, of the British Museum, has kindly gone over these specimens for me, and refers them to the variety known as *rossii* Guenée.

E. nastes is another Arctic species which could not be expected to occur in the forested regions west of Great Bear and Great Slave lakes.

^a Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV (1889), p. 231 B.

^b Arctic Searching Expedition, II, 1851, p. 362.

^c Proc. Ent. Soc. Phila., II, 1863, p. 80.

^d Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 133.

^e Trans. Ent. Soc. London, Pt. 3, 1903, p. 243.

EURYMUS PELIDNE (Boisduval).

Three pairs are mentioned by Elwes.^a They were collected by the Hanbury expedition, as follows: One male, Arctic coast, 16 miles west of Point Epworth, July 11; two males and two females on the Barren Grounds, 114° W., 67° 40' N.; one pale female, Dismal Creek (Kendall River), at its confluence with the Coppermine River, July 30.

In addition to the above series the British Museum collection contains a female specimen of *E. pelidne* from Great Slave Lake, taken in July, 1894, by W. G. Cumming; also a pale female from Fort Good Hope, collected by Miss Elizabeth Taylor, July 19, 1892.^b Mr. Francis A. Heron considers both of these specimens referable to *pelidne*.

ARGYNNIS ATLANTIS Edwards.

This species was first observed at Fort Providence, July 4, 1903. On July 16, I captured a pair on the summit of Mount Tha-on'-tha, in the Nahanni Mountains, at an altitude of 2,500 feet. On my outward trip in August I saw a number of these butterflies near House River, Athabaska,^c and secured a specimen August 21. Mr. Preble took one at the mouth of the North Nahanni River, July 25, 1904.

The following record is given by Scudder: "Arctic America, Ross (Brit. Mus.)."^d This reference is probably to a specimen, or specimens collected by Mrs. Ross at Fort Simpson, or some other point on the Mackenzie River, in the early sixties of last century. The species is recorded by Butler,^e from Fort McMurray, Athabaska, where it was collected by Miss Elizabeth Taylor, August 17, 1892.

ARGYNNIS ELECTA Edwards.

Dr. James Fletcher, of Ottawa, writes me that J. M. Macoun, of the Canadian Geological Survey, collected this species in the vicinity of Dunvegan, Athabaska, in the summer of 1903.

ARGYNNIS EURYNOME var. CLIO Edwards.

Through Doctor Fletcher I learn that the Canadian government collection at Ottawa contains this species from Peace River, Athabaska, in the vicinity of Dunvegan, where J. M. Macoun collected it in the summer of 1903.

^aTrans. Ent. Soc. London, Pt. 3, 1903, p. 243.

^bIn his paper on Miss Taylor's collection (Annals Nat. Hist. (6), XII, 1893, p. 13), A. G. Butler tentatively lists the Fort Good Hope specimen as *interior*.

^cOn the Athabaska River, 10 miles above the Grand Rapids.

^dButterflies of Eastern United States and Canada, I, 1889, p. 576.

^eAnnals Nat. Hist. (6), XII, 1893, p. 12.

BRENTHIS MYRINA (Cramer).

This large *Breuthis* was common in a grassy tamarack swale near the mouth of the North Nahanni River, July 13 to 17, 1903, where I captured a single specimen. The species was not noted elsewhere in the north by either Mr. Preble or myself.

Butler records specimens of *B. myrina* collected by Miss Elizabeth Taylor at the Rapids of the Drowned, Slave River, July 1, and at Fort Good Hope, July 18, 1892.^a

This species is common in portions of Alaska, and has been taken in the region south of Hudson Bay; thence westward to the Lake Winnipeg region, and also at Edmonton, Alberta (latitude 54°). It undoubtedly has a general distribution in the lake country of Athabaska and southern Mackenzie, which future work will prove more satisfactorily.

(?) BRENTHIS BELLONA (Fabricius).

Formerly listed by Edwards from "Great Slave Lake", probably in error.^b It scarcely seems possible that this southeastern species ranges to the latitude of Slave Lake, almost in the Hudsonian zone.

BRENTHIS PALES (Denis and Schiffermüller).

This European species is very rare in America, having been recorded only from Alaska previous to Mr. Elwes's review of the Hanbury collection. Among these butterflies were three males and a female of *pales* from the Barren Grounds (Arctic coast, 15 to 30 miles east of the mouth of Coppermine River), taken July 16 to 18, 1902. Elwes considers these specimens quite typical, having compared them with Alpine and northern Siberian examples.^c

BRENTHIS CHARICLEA (Schneider).

Mr. Hanbury took this species at all localities where he collected on the Barren Grounds in 1902. Elwes remarks upon the great amount of individual variation exhibited by the different specimens, and figures a melanistic male from Chapman Island, a small male from Dismal Creek, very pale, and a large female from Point Epworth, the latter a most peculiar aberration.^d I am informed by Francis A. Heron that in addition to the Hanbury series the British Museum collection contains three males and one female of *B. chariclea* from Great Slave Lake, collected in July, 1894, by W. G. Cumming.

^aAnnals Nat. Hist. (6), XI, 1893, p. 12.

^b*Idem* Scudder, Butterflies of Eastern United States and Canada, I, p. 613 (foot note.)

^cTrans. Ent. Soc. London, Pt. 3, 1903, p. 241.

^d*Idem*, pl. ix, pp. 242-243.

Doctor Strecker refers to this species a number of examples of *Brenthis* which he received from Geffcken. These were said to have been collected in the Athabaska region.^a

BRENTHIS CHARICLEA var. BOISDUVALII (Duponchel).

I found this beautiful variety only upon the summit of Mount Tháo-tha, in the Nahanni Mountains, Mackenzie, where two were captured, July 16, 1903. The insects were flying in a crater-like depression grown up with *Viburnum*, *Rosa*, and *Delphinium*. Mr. Preble secured a specimen at Fort Rae, July 29, 1903; one at Fort Simpson, May 22, 1904; and four at the mouth of the North Nahanni River, July 25, 1904.

I can find no published records of this variety for the Athabaska-Mackenzie region.

BRENTHIS TRICLARIS (Hübner).

This species is uncommon, if not rare, in the Athabaska-Mackenzie region. It was not secured by either Mr. Preble or myself in 1903-4. Edwards records it from Fort Simpson;^b while Strecker mentions a number of specimens from the Athabaska region.^c

BRENTHIS FREIJA (Thunberg).

I secured my first specimen of this species at Athabaska Landing, Alberta, May 15, 1903. It was next noted on the Smith Portage, June 12 and 13, where a fine series of both sexes was collected. At Fort Simpson in 1904 Mr. Preble first observed *B. freija*, May 15, on which date he collected three males. He informs me the insects were then just beginning to appear, but were common about the post a week later. Farther down the Mackenzie River Mr. Preble took two males at Fort Good Hope, June 22, and another specimen at the mouth of the North Nahanni River, July 25, 1904.

Butler records a specimen from Fort Good Hope, Mackenzie, collected July 18, 1892, by Miss Elizabeth Taylor.^d

Edwards apparently did not find *freija* in Mrs. Ross's collection, but Strecker mentions several specimens from the Athabaska region which he received from Geffcken.^e

A *Brenthis* which Richardson secured on the "Arctic coast between 67½° and 68°,"^f was listed by White as the form *tarquinius* Curtis.^g The type of this dark Arctic variety was collected in Boothia Felix by Sir John Ross in the early thirties of last century.^g

^a Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 132.

^b Butterflies of North America, I, 1879 [Synopsis, p. 14].

^c Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 133.

^d Annals Nat. Hist. (6), XII, 1893, p. 12.

^e See Introduction, p. 428 (footnote).

^f Arctic Searching Expedition, II, 1851, p. 362.

^g See Curtis, in Ross's Second Voyage, App., 1835, p. 68.

BRENTHIS POLARIS (Boisduval).

In 1903, I did not meet with *B. polaris* in the region south of Fort Wrigley (latitude 63°). Mr. Preble captured a single example at Fort Good Hope, June 20, 1904.

Mr. Hanbury found this species fairly common along the Arctic coast early in July, 1902, according to Elwes.^a Specimens were taken by the Hanbury expedition, as follows: Gray's Bay, July 3, two males, one female; Point Epworth, July 9 and 12, one pair; Barren Grounds, 114° W., 67° 40' N., one pair.

B. polaris is a species of the Arctic fauna, occurring rarely in the Hudsonian.

BRENTHIS FRIGGA (Thunberg).

This beautiful species was first observed on the Smith Portage, June 12, 1903. Three males and four females were collected at this point. Another individual, which was not captured, was noted at Fort Providence, July 8. In 1904, Mr. Preble collected four specimens at Fort Good Hope, June 21 and 22—three males and a female.

The only previous record is from Fort Simpson. In his report on the butterflies collected by E. W. Nelson in Alaska, Edwards compares specimens of *B. frigga* from St. Michael with Fort Simpson examples.^b

B. frigga is a splendid butterfly, and as it flits about in a grassy muskeg the rich purplish brown on the underside of the secondaries contrasts most beautifully with its surroundings. Specimens are not difficult to capture, as the flight is slower and weaker than with the majority of the genus.

BRENTHIS FRIGGA var. SAGA (Kaden).

A male example of this variety was collected at the Rapids of the Drowned, Slave River, June 29, 1892, by Miss Elizabeth Taylor, and is now in the British Museum. This specimen has previously been recorded as *B. bellona* by A. G. Butler,^c but I am informed by Francis A. Heron that it is properly referable to the present form.

Strecker records specimens secured by Geffeken from the "Athabasca region."^d Whether these specimens were actually collected within the limits of Athabaska district is an open question, as no definite localities are given.

^a Trans. Ent. Soc. London, Pt. 3, 1903, p. 241.

^b Rept. Nat. Hist. Collections in Alaska, Pt. 4, 1887, p. 328.

^c Annals Nat. Hist. (6), XII, 1893, p. 12.

^d Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 133.

BRENTHIS FRIGGA var. IMPROBA (Butler).

The type came from Mackenzie River delta.

Hanbury secured two pairs on the Barren Grounds, 114° W., 67° 40' N., and a male at Point Epworth in 1902, which Elwes considers typical of this form.^a Butler based his description of *Argynnis improba* upon specimens taken by Richardson between latitude 67½° and 68°, in the Mackenzie River delta. These specimens, much worn, were presented to the British Museum by Richardson in 1851.

PHYCIODES BATESII (Reakirt).

A specimen of *Phyciodes* which I collected at Fort Providence early in July, 1903, seems to be referable to *P. batesii*, although greatly extending the previously recorded range of that species. Compared with specimens of *P. tharos* from New York, the Fort Providence specimen differs in having a pale yellow or almost white band beyond the cell of the fore wings. The black bars in the cell of the primaries also do not extend below the median vein.

PHYCIODES THAROS (Drury).

Represented in Mr. Preble's collection by a fresh female from Fort McPherson, July 8, 1904, and a battered example from the mouth of the North Nahanni River, July 25.

Previously recorded by Scudder, who gives the two following references: "Mackenzie River (Edwards); Upper Liard River (Dawson)."^b Doctor Fletcher records specimens collected by R. G. McConnell, of the Canadian Geological Survey at the Devil's Portage, Liard River (longitude, 126° 10'), in 1888.^c Butler records two males and a female of this species which were collected at the Rapids of the Drowned, Slave River, June 29, 1892, by Miss Elizabeth Taylor.^d

PHYCIODES THAROS var. MORPHEUS (Fabricius).

A. G. Butler records a female of this form from the Rapids of the Drowned, Slave River, where it was collected July 1, 1892, by Miss Elizabeth Taylor.^d

PHYCIODES PRATENSIS (Behr).

Doctor Fletcher has recorded this mountain species from the upper Liard River (latitude, 60°), where R. G. McConnell collected it, June 26, 1888.^c

^a Trans. Ent. Soc. London, Pt. 3, 1903, p. 242.

^b Butterflies of Eastern United States and Canada, I, 1889, p. 636.

^c Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 230 B.

^d Annals Nat. Hist. (6), XII, 1893, p. 12.

Doctor Fletcher informs me that the Canadian government collection also contains specimens from the vicinity of Dunvegan, Peace River, Athabaska, collected by J. M. Macoun in the summer of 1903.

POLYGONIA COMMA (Harris).

In the Fort Simpson collection which Edwards received from Mrs. Ross were several butterflies which he formerly referred to *comma*,^a but later to the winter form *harrisii* (=syn. *comma*).^b As there were no specimens representing the summer form *dryas*, Edwards concluded that the species is single-brooded in that latitude.

I can find no other records of occurrence.

POLYGONIA ZEPHYRUS (Edwards).

This western *Polygonia* is included in the present list solely on the strength of Edwards' Fort Simpson reference.^c No further data are given, but the specimen is supposed to have been received by Edwards from Mrs. Ross. Fort Simpson is far north of the normal range of *P. zephyrus*, and recent collections from Mackenzie River localities have not contained it.

POLYGONIA FAUNUS (Edwards).

This butterfly seems to have a general distribution in Athabaska and southern Mackenzie. I noted it in 1903, as follows: Pierre au Calumet,^d May 29, one; Smith Landing, June 12, two; Fort Resolution, June 23, two; delta of the Athabaska River, August 5, two; Pelican Rapid, Athabaska River, August 25, one. A single specimen was collected at Smith Landing, June 12. Mr. Preble collected another example at Fort Simpson, May 24, 1904.

Edwards records this species from Fort Simpson;^e while Scudder mentions specimens from "Great Slave Lake," which are in the Museum of Comparative Zoology in Cambridge.^f

POLYGONIA GRACILIS (Grote and Robinson).

I collected a specimen of this species at Fort Providence, July 3, 1903. It was taken at the flowers of the silverberry (*Elæagnus argentea*). Mr. Preble secured three specimens in 1904, one at each of the following localities: Fort Simpson, April 24; Fort Good Hope, June 22; Fort McPherson, July 8.

^a Butterflies of North America, I, 1879, [p. 102].

^b Idem, III, 1897, [p. 171].

^c Idem, I, 1879, [p. 125].

^d On Athabaska River, 50 miles below Fort McMurray.

^e Butterflies of North America, I, 1879 [p. 100].

^f Butterflies of Eastern United States and Canada, I, 1889, p. 354.

A specimen from "Great Slave Lake" in the "Cambridge Museum" (Museum of Comparative Zoology) is mentioned by Scudder.^a Strecker records a specimen from the "Athabaska region," obtained from Geffcken.^b Francis A. Heron informs me that there is a specimen in the British Museum, collected at Great Slave Lake in July, 1894, by W. G. Cumming.

Although apparently of general distribution in the North, *P. gracilis* is nowhere common.

POLYGONIA PROGNE (Cramer).

This species was not taken by us in 1903-4. White records specimens taken by Richardson at Fort Simpson, and also on the "Arctic Coast between $67\frac{1}{2}^{\circ}$ and 68° ," in 1848.^c Scudder^d expresses doubt as to the Arctic coast specimens being *progne*, but makes no comment on the Fort Simpson record.

In more recent years Doctor Fletcher has recorded *progne* from Fort Simpson, where Frederick Bell collected two examples, July 12, 1888.^e It has also been taken at Fort McLeod, British Columbia, and on Belly River, Alberta (Capt. Gamble Geddes).

EUGONIA J-ALBUM (Boisduval).

Two of these butterflies were seen on the Athabaska River, some 60 miles above the delta, August 6, 1903. A pile of freshly-cut spruce wood lying on the steamer apparently attracted the insects, as they flew about the deck as long as the boat was moored to the river bank. Both butterflies were in good condition, but eluded capture.

Scudder has the following note in regard to *E. j-album*: "Specimens labeled 'Arctic America, Ross,' may be seen in the British Museum, probably collected in the vicinity of Great Slave Lake."^f I can find no further records for the Athabaska-Mackenzie region, but the species has been taken at various localities in the southern provinces. Apparently its range is restricted to the Canadian fauna.

EUVANESSA ANTIOPA (Linnæus).

The Mourning Cloak butterfly occurs commonly throughout the region as far north as Fort McPherson (latitude $67^{\circ} 20'$). I first observed it on July 4, 1903, at Fort Providence, where numbers were flying about the young growth of aspen (*Populus tremuloides*). On my

^a Butterflies of Eastern United States and Canada, I, 1889, p. 361.

^b Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 132.

^c Arctic Searching Expedition, II, 1851, p. 362.

^d Butterflies of Eastern United States and Canada, 1889, I, p. 369.

^e Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231 B.

^f Butterflies of Eastern United States and Canada, I, 1889, p. 384.

outward trip two were noted at House River, Athabaska, August 21. Mr. Preble captured a specimen on Lake Hardisty, on the traverse between Fort Rae and Great Bear Lake, August 16, 1903. In 1904 he observed it at Fort Simpson, on April 17, and took two specimens at Fort Good Hope, June 21, and another at the mouth of Peel River, near Fort McPherson, July 1.

Strecker mentions a number of examples of *E. antiopa* from the "Athabaska region," received from Geffcken; ^a H. F. Wickham records several specimens taken by Frank Russell, of the University of Iowa, at Fort Rae in August, 1893; ^b while specimens collected by William Ogilvie on the Mackenzie River, 90 miles above Fort Good Hope, July 19, 1888, and at Fort Smith, August 24, 1888, have been recorded by Doctor Fletcher. ^c

AGLAIS MILBERTI (Godart).

This species was common at Fort Resolution, June 21 to 27, and at Fort Providence, July 4 to 8, 1903. It was usually observed feeding at the flowers of *Elæagnus argentea*. Three examples were taken.

A. milberti was collected at Fort Simpson as early as 1848, by Richardson; ^a Strecker received specimens from Geffcken which had been taken in the region between Hudson Bay and Lake Athabaska; ^a Scudder refers to specimens in the British Museum labeled "Arctic America, Ross"; ^c eleven specimens were collected at Fort Simpson, June 26 to July 20, 1888, by Frederick Bell, and recorded by Doctor Fletcher; ^c while H. F. Wickham lists several which Frank Russell secured at Fort Rae, August 12, 1893. ^b

VANESSA ATALANTA (Linnæus).

This and the two preceding species are among the most characteristic butterflies of the Northland. *V. atalanta* was first noted June 9, 1903, near the confluence of Rivière de Rochers and Peace River. It was abundant at Fort Resolution, June 23 to 27, where it was chiefly noted on *Ribes* blossoms. At Fort Providence, July 3 to 8, it was feeding on both *Ribes* and *Elæagnus*. Several of these butterflies were also observed near House River, Athabaska, August 21. A specimen captured at the latter locality was perfectly fresh.

Although I found this species so common in 1903, it seems to have hitherto escaped observation in the region under review. It has been taken, however, in the region about Fort Churchill, Hudson Bay.

^a Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 132.

^b Explorations in the Far North, 1898, p. 276.

^c Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231 B.

^d White, in Arctic Searching Expedition, II, 1851, p. 362.

^e Butterflies of Eastern United States and Canada, 1, 1889, p. 425.

VANESSA CARDUI (Linnæus).

This cosmopolitan butterfly is not absent from even the somewhat rigorous Northland. I first observed it June 16, 1903, on the Slave River, near the Grand Détour.^a A few were seen at Fort Resolution, while at Fort Providence it was common, feeding on *Ribes* and *Eleagnus*.

There are several records for *V. cardui* in the southern provinces, and also in Alaska, but former observers in Athabaska and Mackenzie have not recorded it.

BASILARCHIA ARTHEMIS (Drury).

This handsome butterfly was found by us only in the Mackenzie Basin. Several were noted at Fort Providence, July 4, and two at Fort Simpson, July 10, 1903; while in the region near the mouth of the North Nahanni River it was common from July 13 to 19 of the same year. I found this species in the alder thickets on Mount Thaoñ-tha, Nahanni Mountains, as high as 2,000 feet. Mr. Preble took a specimen in a poplar thicket near this mountain, July 25, 1904.

B. arthemis is a striking butterfly, and one of the most characteristic sights, as we "tracked" our canoe up the swiftly-flowing Nahanni, was the frequent glimpse of black and white as these butterflies flitted about in the dark green foliage of the alders which everywhere fringed the stream.

According to White this species was collected at Fort Simpson, and also on the "Borders of Mackenzie and Slave Rivers." by Richardson in 1848.^b Edwards has the following in regard to it: "I formerly received a large invoice of butterflies collected by Mrs. Christina Ross at Fort Simpson, Mackenzie's River, and among them were many *arthemis*."^c Geffeken had several examples from the Athabaska region, which he sent to Strecker.^d Doctor Scudder has recorded specimens which the late Doctor Dawson, of the Canadian Geological Survey, collected at the Devil's Portage, Liard River.^e Four others, collected at Fort Simpson in 1888 by Frederick Bell, are listed by Doctor Fletcher.^f One of the latter specimens was recorded as *arthemis*, and three as belonging to the dimorphic form *lamina* Fabricius, which latter name has been dropped.^g Specimens taken by Miss Elizabeth Taylor at Fort Simpson, July 9, and Fort Good Hope, July 18, 1892, have been recorded by A. G. Butler.^h

^a Fifty miles below Fort Smith, Mackenzie.

^b Arctic Searching Expedition, II, 1851, p. 362.

^c Butterflies of North America, II, 1884 [p. 209].

^d Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 133.

^e Butterflies of Eastern United States and Canada, I, 1889, p. 298.

^f Ann. Rep. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231B.

^g See Dyar, List. N. Am. Lep., Bull. No. 52, U. S. Nat. Mus., 1902, p. 25.

^h Annals Nat. Hist. (6), XII, 1893, p. 12.

CHLORIPPE, species.

A large species of *Chlorippe* was noted at Fort Chipewyan, June 4, 1903, but eluded capture. I had been hunting birds in a shady ravine on the main shore opposite English Island, and late in the afternoon noticed a dark insect flitting back and forth at intervals between a couple of willows which were running sap. Upon a near approach I found it to be a large *Chlorippe*, but further identification was impossible. The insect greatly resembled *C. dyton*.

Chlorippe is a southern genus, and has not previously been observed as far north as Athabaska.

EREBIA FASCIATA (Butler).

Elwes has recorded several specimens which Mr. Hanbury collected in 1902 at the following Arctic coast localities: Chapman Island, June 27; Cape Barrow, June 30; Gray's Bay, July 1; Point Epworth, July 11.^a

EREBIA DISCOIDALIS (Kirby).

A common species in Athabaska and Mackenzie. I collected a specimen at Edmonton, Alberta, as early as May 10, 1903, and on June 12 two more at Smith Landing, Athabasca. In 1904, Mr. Preble found this butterfly at the following localities in the Mackenzie Basin: Fort Simpson, May 20; Fort Norman, June 13; Fort Good Hope, June 21 and 22.

Nearly all previous observers mention *discoidalis*. White records an *Erebia* taken by Richardson on the Arctic coast as follows: "*Hipparchia* n. s.? (near *H. discoidalis*), Kirby."^b In 1863, Edwards received about twenty examples from Mrs. Christina Ross, all taken at Fort Simpson.^c Strecker mentions over a hundred specimens in the collection he received from Geffcken, said to have been collected in the "Athabasca region."^d Frederick Bell collected specimens at Fort Simpson in 1888, according to Doctor Fletcher.^e

This is the common *Erebia* in the forested region, being replaced on the Barren Grounds by several other species. Kirby based his description of *discoidalis* upon specimens from Cumberland House, Saskatchewan (latitude 54°).

^aTrans. Ent. Soc. London, Pt. 3, 1903, p. 239.

^bArctic Searching Expedition, II, 1851, p. 362.

^cButterflies of North America, III, 1897 [p. 255].

^dLepidoptera, Rhopaloceres and Heteroceres, 1872, p. 132.

^eAnn. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231B.

EREBIA ROSSII (Curtis).

This beautiful Arctic species, the type of which came from Boothia Felix, seems to have been taken in Mackenzie by only two collectors. White records it from the "Arctic Coast between $67\frac{1}{2}^{\circ}$ and 68° ," where Richardson collected it in 1848;^a while Elwes records three specimens taken by the Hanbury expedition—a pair on the Barren Grounds (114° W., $67^{\circ} 40'$ N.), July 14, and one at Point Epworth, July 11, 1902.^b

EREBIA DISA Thunberg.

Three males and a female were collected by Mr. Hanbury at Point Epworth, July 11, 1902. Elwes considers them to be much nearer specimens of *E. disa* from Finland than to our var. *mancinus* from Alaska.^c

EREBIA YOUNGI Holland.

Mr. Preble collected two specimens at Fort McPherson, July 8, 1904, thus extending the range of this species east of the Rocky Mountains. These examples differ in no respect from Alaska specimens of *youngi*.

EREBIA EPIPSODEA (Butler).

Doctor Fletcher informs me that the Canadian government collection at Ottawa contains this species from the vicinity of Dunvegan, Peace River, Athabaska, where J. M. Macoun collected specimens in the summer of 1903.

E. epipsodea is a mountain species, and probably occurs over most of western Athabaska.

COENONYMPHA OCHRACEA (Edwards).

This dainty little butterfly was common at Fort Providence from July 3 to 8, 1903, where, on bright mornings, numbers could be seen flitting about on the open rocky hillside near the river. I easily collected a good series of both sexes. Nearly all were perfectly fresh, indicating that the species had not been flying many days at that point.

C. ochracea has previously been recorded from Red Deer River, Alberta, but apparently from no farther north.

COENONYMPHA TIPHON var. MIXTURATA Alpheraky.

Elwes considers two males and a female taken by Hanbury on Dismal Creek (Kendall River), east of Great Bear Lake, July 30, 1902, as most closely approaching the Kamchatkan form.^d

^a Arctic Searching Expedition, II, 1851, p. 362.

^b Trans. Ent. Soc. London, Pt. 3, 1903, p. 240.

^c Idem, p. 239.

^d Idem, p. 241.

SATYRODES CANTHUS (Linnæus).

I observed this butterfly but once, at Smith Landing, Athabaska, June 12, 1903. Apparently rare in the north.

Scudder mentions specimens from the vicinity of Great Slave Lake.^a

GENEIS CHRYXUS Doubleday and Hewitson.

One example from the Nahanni Mountains, July 16, 1903. It was taken on a rock slide, together with two or three other species of *Oeneis*. Mr. Preble captured a female at Fort Good Hope, June 23, 1904.

O. chryxus is more common in the southern and eastern provinces.

GENEIS JUTTA (Hübner).

I collected three specimens on a rock slide in the Nahanni Mountains, July 16, 1903. Doctor Dyar considers them intermediate in coloration between normal *jutta* and var. *alaskensis* Holland.

Doctor Strecker mentions specimens from the "Athabasca region," which he received from Herr Geffken, of Stuttgart, Germany.^a

Like the preceding species, *jutta* seems to be more abundant in the southern and eastern provinces, although its range is undoubtedly continuous, connecting with that of var. *alaskensis* on the northwest.

GENEIS BORE (Hübner).

According to Butler, Miss Elizabeth Taylor collected this species at the Rapids of the Drowned, Slave River, June 28, 1892.^b

GENEIS TAYGETE (Hübner).

Three examples were collected at Fort McPherson, July 8, 1904, by Edward A. Preble.

Richardson collected a pair of these butterflies on the "Arctic Coast between 67½° and 68°," which White records as *Chionobas bore* Boisid.^c A small series of *taygete*, comprising five males and three females, was taken by Haubury at Gray's Bay, Point Epworth, and on the Barren Grounds to the westward of Point Epworth, early in July, 1902. These specimens have been listed by Elwes.^d

This variety has been taken in Alaska, and is common in portions of Labrador, apparently inhabiting the tundra regions only.

GENEIS SUBHYALINA (Curtis).

I captured a single specimen in the Nahanni Mountains, July 13, 1903.

^a Butterflies of Eastern United States and Canada, I, 1889, p. 198.

^b Annals Nat. Hist. (6), XII, 1893, p. 12.

^c Arctic Searching Expedition, II, 1851, p. 362.

^d Trans. Ent. Soc. London, Pt. 3, 1903, p. 240.

CENEIS SEMIDEA(?) (Say).

Five specimens from the Barren Grounds and one from Point Epworth, taken by Hanbury, are referred by Mr. Elwes to either *semidea*, or *crambis* Freyer, but not closely approaching either.^a *Crambis* is given as a synonym of *subhyalina* by Dyar.^b

CENEIS CARYI Dyar.

The type of this new variety, a male in beautiful condition, was taken June 13, 1903, in an open growth of Banksian pine (*Pinus divaricata*) on the Smith Portage, Athabaska.

Caryi is a form of *norma*, and differs from that species, as well as from var. *katahdin* Newcomb, in having the red color of the wings much darker and more rusty.

CENEIS NAHANNI Dyar.

The type of this well characterized species came from Nahanni Mountains, Mackenzie. The pair from which it has been described was collected on Mount Tha-on'-tha, Nahanni Mountains, Mackenzie, July 16, 1903, at 2,500 feet altitude.

Butterflies of this genus were fairly common on the north slope of the mountain, occurring chiefly among the rock slides. It would be impossible to say which species predominated, as I was occupied with miscellaneous collecting, and merely caught lepidoptera as occasion offered. There is no distinguishing of species on the wing with butterflies of this genus. One habit all shared alike—that of “sneaking,” i. e., crawling and half flitting about on the rock piles until a convenient crack or crevice afforded them concealment. This was almost invariably done immediately after the insect alighted. I found them very difficult to flush, and when a butterfly did take to the air the flight seldom was sustained for more than a rod.

O. nahanni differs in color from *uhleri* Reakirt, and the markings and striations below are much coarser than in the forms of *norma* Thunberg. I can do no better than quote the characterization from the original description:^c

Blackish above, washed with ferruginous brown, the veins darker, the markings of underside showing. A small ocellus or none above vein five, on fore wings, two to five on hind wings, the one above vein five largest, the rest small or absent. Hind wings below black and white, coarsely strigose, somewhat as in *uhleri* Reakirt, and *varuna* Edwards, but much more densely, the white of the wing being largely obscured. Median band weakly indicated; ocelli black with white pupils; fore wings shaded with red over the disk.

^aTrans. Ent. Soc. London, Pt. 3, 1903, p. 240.

^bList N. Am. Lep., Bull. No. 52, U. S. Nat. Mus., 1902, p. 31.

^cProc. Ent. Soc. Wash., VI, 1904, p. 142.

ANOSIA PLEXIPPUS (Linnæus).

I saw one of these butterflies in the poplar forest back of Fort Providence, July 3, 1903, but did not capture it.

This common species seems to be rare in the north, as no previous observers have recorded it from Mackenzie. Scudder records it from the "Athabasca country" on the authority of Geffcken,^a but it is not mentioned by Strecker in his list of the northern collection which he received from Geffcken.^b

A. plexippus occurs in portions of Alaska, and is common in the southern provinces of Canada.

INCISALIA IROIDES (Boisduval).

A common butterfly in the forest region. I took five at Fort Chipewyan, Athabaska, June 3, 1903, and others on the Smith Portage, June 13. In 1904, Mr. Preble secured a specimen at Fort Good Hope, June 22. Apparently it has been overlooked by former observers in the Athabaska-Mackenzie region.

In Alberta the species was taken at Edmonton, and observed along the Athabaska trail between that point and Athabaska Landing. It was flying abundantly in a forest of Banksian pine along Towattinow Creek, some 20 miles south of the Landing, May 14, 1903.

EPIDEMIA DORCAS (Kirby).

Apparently uncommon. One was seen at Fort Chipewyan, June 3, 1903, and a fresh specimen taken in the Nahanni Mountains, July 13.

E. dorcas occurs in the southern provinces, and also in Alaska. The type locality is Cumberland House, Saskatchewan (latitude 54°).

CUPIDO SÆPIOLUS (Boisduval).

Several were seen July 1, 1903, in a marsh bordering Great Slave Lake, near Hay River post. At Fort Providence, a little later in the month, *sæpiolus* was common in an open pasture just back of the Catholic Mission. Four males were taken, two at each locality. Mr. Preble collected another male example near the mouth of the North Nahanni River, July 25, 1904.

Doctor Fletcher has recorded this species from the Devil's Portage, Liard River (126° 10' W.), where R. G. McConnell, of the Canadian Geological Survey, secured specimens in 1888.^c

^a Butterflies of Eastern United States and Canada, I, 1889, p. 728.

^b Lepidoptera, Rhopaloceres and Heteroceres, 1872, p. 132.

^c Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231 B.

CUPIDO AMICA (Edwards).

The type of this species came from "Mackenzie's River."

Not recorded by recent observers. The type was received by Edwards from Mrs. Ross, who collected it at some point on the Mackenzie River.^a

NOMIADES COUPERII (Grote).

This is a common species in the region between Fort Chipewyan and Fort Good Hope. It was feeding at *Fragaria* blossoms on the Smith Portage, and also frequented damp situations and mud holes along the trail. Specimens were taken in 1903 at Fort Chipewyan, Smith Landing, Fort Resolution, and Hay River, both sexes being represented in the series. Mr. Preble collected three examples at Fort Good Hope, June 21, 1904.

A. G. Butler has recorded this species from the "Athabasca River," where Miss Elizabeth Taylor collected it June 5, 1892.^b

AGRIADES PODARCE (Felder).

This exquisite little species was quite common on the exposures of Archaean rock near Smith Landing, Athabaska, where I collected a fine series of both sexes in perfect condition, June 11 and 12, 1903. When flushed the flight is weak and low, rarely more than six inches above the rock. Unlike most species of the genus, *podarce* feels safe only when on the rocks, where it hides most effectually in the short moss. It is easily overlooked unless sought for, and when on bare rock its detection is almost an impossibility. I often had two or three flush at my feet after having endeavored ineffectually for some time to beat them up. Whenever a passing cloud obscured the sun these butterflies could not be forced to take wing.

The only previous record for the Athabaska-Mackenzie region seems to be that of Butler,^b who records specimens taken by Miss Elizabeth Taylor at the Rapids of the Drowned, Slave River, July 1, 1892. Miss Taylor's locality is but a very few miles from Smith Landing. The range of *A. podarce* thus appears to be very local.

^aIn his original description of *amica* Edwards says he received the species from "Mackenzie's River by Mrs. Ross." In the synopsis of North American butterflies at the end of his first volume (Butt. N. Am., 1879, I) Edwards gives the type locality as "Fort Ross, Mackenzie's River." There is no such post as Fort Ross at the present time, nor can I find any reference to it. Edwards probably referred to Fort Simpson, where B. R. Ross was located for many years as factor.

^bAnnals Nat. Hist. (6), XII, 1893, p. 13.

AGRIADES AQUILO (Boisduval).

Under the name "*Polyommatus franklinii*" White records specimens which Richardson collected on the Arctic coast of western Mackenzie in 1848.^a Mr. Hanbury collected a pair on the Barren Grounds (140° W., 67° 40' N.), in 1902, which Elwes refers to *Lycæna orbitulus* var. *franklinii* Curtis.^b According to Doctor Dyar *franklinii* Curtis and *aquilo* Boisduval are synonymous.^c

CYANIRIS LADON var. LUCIA (Kirby).

There seems to be but one record for this form of *ladon* in the Athabaska-Mackenzie region, although its distribution should be general throughout the forested region. Doctor Fletcher records a single example collected by Frederick Bell at Fort Simpson, June 25, 1888.^d All of the specimens of *ladon* secured by Mr. Preble and myself seem to be referable to the form Doctor Fletcher has recently described as var. *nigrescens*, from Kaslo, Kootenay Lake, British Columbia.^e

CYANIRIS LADON var. NIGRESCENS Fletcher.

I captured a male of this form near the Grand Détour, Slave River, Athabaska, June 16, 1903. In the lower Mackenzie Basin Mr. Preble took specimens in 1904, as follows: Fort Norman, June 12, one example; Fort Good Hope, June 21 to 23, ten; Fort McPherson, July 6 to 8, two.

In Alberta, I collected a male at Edmonton, May 10, and four males at Vermillion River, May 13, 1903, all in perfect condition.

EVERES COMYNTAS (Godart).

This species was not uncommon in Athabaska and southern Mackenzie in 1903. Specimens were collected as follows: Smith Landing, June 12, two males; Fort Resolution, June 24 to 26, four males; Fort Providence, July 8, one male.

Scudder refers to specimens in the British Museum, labeled "Arctic America, R. B. Ross."^f These specimens probably were received from Fort Simpson through B. R. Ross. Butler mentions specimens collected by Miss Elizabeth Taylor at the Rapids of the Drowned, Slave River, June 29, 1892.^g

E. comyntas was usually observed at the flowers of *Fragaria*, *Potentilla*, and other low-flowering plants.

^a Arctic Searching Expedition, II, 1851, p. 362.

^b Trans. Ent. Soc. London, Pt. 3, 1903, p. 242.

^c List N. Am. Lep., Bull. No. 52, U. S. Nat. Mus., 1902, p. 44.

^d Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231 B.

^e Trans. Roy. Soc. Canada, Sec. IV, 1903, p. 213.

^f Butterflies of Eastern United States and Canada, II, 1889, p. 914.

^g Annals Nat. Hist. (6), XII, 1893, p. 13.

EVERES AMYNTULA (Boisduval).

Doctor Fletcher has recorded this species from the Devil's Portage, Liard River (longitude $126^{\circ} 10'$), where R. G. McConnell, of the Canadian Geological Survey, collected it on July 17, 1888.^a

RUSTICUS SCUDDERI (Edwards).

I can find but two records of the capture of this species in the region under review. A. G. Butler records three male specimens in the British Museum, which were collected by Miss Elizabeth Taylor on the east bank of the Mackenzie River, 30 miles north of the Arctic Circle, July 18, 1892.^b Specimens secured in the vicinity of Dunvegan, Peace River, Athabaska, by J. M. Macoun, in the summer of 1903, have been determined by Doctor Fletcher, and are in the Canadian government collections at Ottawa.

RUSTICUS MELISSA (Edwards).

Dr. James Fletcher, of Ottawa, informs me that there are specimens of this species in the Canadian government collections under his charge, collected by J. M. Macoun in the summer of 1903, near Dunvegan, Athabaska.

PAMPHILA PALÆMON (Pallas).

I found this diminutive species only at Fort Providence. Several individuals were seen among the sedges in a tamarack muskeg, and one captured, July 4, 1903. This "skipper" is very easily overlooked, because of its small size.

P. palæmon has been taken at Banff and Lacombe, Alberta,^c and has a wide range in the southern provinces.

ERYNNIS COMMA (Linnæus).

Two specimens in good condition were collected on the summit of Mount Tha-on'-tha, Nahanni Mountains, July 16, 1903. Not observed elsewhere, nor are there previous records of its capture in the Athabaska-Mackenzie region.

ERYNNIS COMMA var. MANITOBA Scudder.

Francis A. Heron, of the British Museum, writes me that Miss Taylor's specimens from Slave River, which Butler has recorded as *E. colorado*,^d are more properly referable to the present form. These specimens, a pair, were taken at the Rapids of the Drowned, Slave River, June 29 and 30, 1892.

^a Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231 B.

^b Annals Nat. Hist. (6), XII, 1893, p. 13.

^c Can. Ent., XXXIII, 1901, p. 171.

^d Annals Nat. Hist. (6), XII, 1893, p. 14.

THORYBES PYLADES (Scudder).

A common butterfly along the Smith Portage, Athabaska, but observed nowhere else in the north. Five specimens, Smith Portage and Fort Smith, June 12 to 14, 1903, were taken about mudholes along the trail.

THANAOS ICELUS Lintner.

This familiar "skipper" was not uncommon on the Smith Portage, Athabaska, where it was taken with the preceding species. A number were also secured at Fort Resolution late in June, and Mr. Preble took two specimens at Fort Norman, June 10, 1904.

Specimens collected at Fort Simpson, June 26, 1888, by Frederick Bell, have been recorded by Doctor Fletcher.^a

THANAOS PROPERTIUS var. BOREALIS, new variety.

Genital armature similar to that of *propertius*; tip of right piece long and finger-shaped. Wings more heavily clouded with dusky, and light spots reduced to a minimum; hoary gray on fore wings largely restricted to outer third. Transverse series of four light spots near costal margin on apical portion of primaries small, punctiform, distinct; rest of light spots obsolete. Marginal and submarginal series of spots on under surface of secondaries showing faintly on upper surface.

One male, mouth North Nahanni River, Mackenzie, June 4, 1904. Edward A. Preble.

Type.—No. 9869, U.S.N.M.

This is a small, dark, boreal variety of the common *T. propertius* of the northern Pacific coast region of the United States, and is based upon a male specimen in fairly good condition.

THANAOS MARTIALIS (Scudder).

In his review of Miss Elizabeth Taylor's northern collection, A. G. Butler records this species from the Rapids of the Drowned, Slave River, June 29, 1892.^b

HESPERIA CÆSPITALIS (Boisduval).

Early in July, 1903, I saw a number of these butterflies on the rocky bank of the Mackenzie River at Fort Providence, but found them exceedingly difficult to capture. Two fresh examples were taken—Smith Portage, June 12, and Fort Providence, July 5, 1903.

Although common in Alberta, *H. cæspitalis* has not heretofore been recorded from the Athabaska-Mackenzie region.

^a Ann. Rept. Can. Geol. Surv., III (new ser.), Pt. 1, App. IV, (1889), p. 231 B.

^b Annals Nat. Hist. (6), XII, 1893, p. 14.

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